

Original Article

The Occurrence of Red-Back Spider *Latrodectus hasselti* (Araneae: Theridiidae) in Bandar Abbas, Southern Part of Iran

M Shahi¹, A Hosseini¹, K Shemshad³, *J Rafinejad²

¹School of Public Health, Hormozgan University of Medical Sciences, Bandar Abbas, Iran

²Department of Medical Entomology and Vector Control, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran

³Department of Entomology, Science and Research Branch, Islamic Azad University, Tehran, Iran

(Received 2 Feb 2010; accepted 5 Mar 2011)

Abstract

Background: Due to importance and fatal affect of Red-back spiders, *Latrodectus hasselti*, a faunistic survey for presence of this spider in Bandar Abbas has been conducted. This animal is considerably the most medically importance spiders all over the world.

Methods: Live adult spider specimens were collected from Bandar Abbas town using hand catch conventional method and transferred to the laboratory throughout the summer of 2008. They were identified based on morphological characteristics and taxonomic keys and confirmed by some external experts.

Results: Results showed the occurrence of the red-back spider, *L. hasselti* from Bandar Abbas, southern port of Iran. Two female specimens were found. The spider had specific morphological characters including black color with an obvious orange to red longitudinal strip on its upper parts of abdomen.

Conclusion: Although the specimens were collected from south of the country, however since the region is an important harbor and port and goods come form different parts of world we assume the possibility of arrival from its origin and native breeding sites of the world. Therefore further investigation is needed to clarify the presence of this species in different parts of Iran.

Keywords: *Latrodectus hasselti*, Spider, Iran

Introduction

About 40,000 spiders have been recognized and this is less than half of the expected number of 100,000 to 200,000 species. Most of the species have not yet been described (Ellis et al. 2005). Widow spiders of the genus *Latrodectus* are found worldwide (Graudins et al. 2001). Red-back spiders, *L. hasselti*, are widow spiders (Stallybrass 1969) and are the most medically importance spiders all over the world, and certainly in Australia (Stallybrass 1969, Clark et al. 1992, Vetter and Visscher 1998, Isbister and Gray 2002). The dangerous red-back, *L. hasselti*,

belongs to Theridiidae family and these spiders are famous for having neurotoxin venom (Cariaso 1967). Its bite is usually mild and frequently may not be felt. Symptoms may arise up to an hour after biting and start as a reddish lump with red streaks publishing out from it. Typical envenomations of red-backed spider being the most toxic cases of all the member of the genus *Latrodectus* and only the female bite is dangerous. The venom affects directly on the nerves, causing in release and consequently depletion of neurotransmitters.

*Corresponding author: Dr Javad Rafinejad, E-mail: jrafinejad@yahoo.com

Common early symptoms are pain (which can become severe), sweating (always including local sweating at bite site), muscular weakness, nausea, vomiting, painful abdominal cramping, increasing blood pressure, perspiration and rigidity accompanied by severe hypertension. The very young or elderly persons are high risk groups, especially those who have preexisting cardiovascular disease (Cavalieri 1987, Korsznak and Story 1994). Severe ache was explained as pain more than a bee sting or alike it, and “increasing pain” as pain that increased within the first hour (Geoffrey and Gray 2003). There is no report of sting by this spider in the region.

The genus *Latrodectus* has wide distribution especially in tropical and temperate areas of the world. This species is distributed in a wide area from south-east Asia to Australia and New Zealand. Its natural habitat is in places around buildings, outdoor furniture, machinery and pile of materials. In the bush, they nest under logs and rocks. This spider builds its webs in dry, sheltered places, e.g. among stones, in logs, culverts and sheds (Forster 1995). The red back spider is a native species to Australia (Nimorakiotakis and Winkel 2004). Since 1959 the Australian species were known as *L. mactans hasselti* and was believed conspecifics with *L. mactans* Fabricius populations as far distant as the Mediterranean (Levi 1959, 1966). However, the taxonomy of this genus is still largely unresolved (Levi 1983). Recent researches (Forster and Kingsford 1983, Forster 1984) approve the view that it is a species in its own right, *L. hasselti* Thorell, and it appears to have become established in New Zealand (Forster 1984) where two related species, *L. katipo* Powell and *L. atritus* Urquhart occur (Forster and Kingsford 1983). *Latrodectus hasselti* moves by walking on the ground, especially in seashores during early stages of infestation, and can be transported over distances by various machines, mainly in inlands and cannot change its place by ballooning (Nihei et al. 2004).

The poison of the *Latrodectus* genus is that consist some of the most important biologic toxins. These matters produce their effectiveness in which destabilization of cell membranes and degranulation of nerve terminals resulting in the release of neurotransmitters can occur (Nicholson and Graudins 2002). Here, in this study we tried to determine the spider fauna of Bandar Abbas, one of the most important ports in southern Iran.

Materials and Methods

Study area

Hormozgan is a province in southeast of Iran. Bandar Abbas is center of Hormozgan Province, located at Latitude 27° 11' north; longitude 56° 16' east, 25 meters above sea level, with an area of 45 km² (Fig.1). This city is located in coastal area and has hot and humid climate. The rainfall is around 251 mm, annually. Maximum temperature in summer is 45° C and minimum temperature in winter is 6 °C. The average annual temperature in Bandar Abbas City is about 27° C. Maximum relative humidity is 100% and the minimum is as low as 46% (Iran Climatology Center).

Spider collection

Spiders were collected in spring 2004 in an open air north of Bandar Abbas City by visually searching. All specimens were collected close to the human dwellings. The specimens were preserved in 75% Alcohol. For species identification several limitations including morphology and collecting localities have been considered. Recognition was carried out by morphological characteristics according to the international standard taxonomic key diagnostic (Roth 1982). Morphological limitations were photographed by Nikon XN model stereomicroscope. All measurement is given in millimeters. Length and width variations of the body, cephalothorax and abdomen are given below.

Results

Description: Two females red-back spider were found in north Bandar Abbas City.

Adult female (specimen No. 1) (Fig. 2): The total length of body, the length and width of cephalothorax as well as the length and width of abdomen are 10, 4, 3, 6 and 4.5 mm respectively. Body colors: Both females red-back spider were black with an orange to red longitudinal stripe on the upper surface of their abdomen. Fig. 2–4 show morphological characteristics of the red-back spider.

Adult female (specimen No. 2): The total length of body, the length and width of cephalothorax as well as the length and width of abdomen are 11, 5, 4, 7 and 6 mm respectively. Body colors: Both females red-back spider were black with an orange to red longitudinal stripe on the upper surface of their abdomen. Fig. 2–4 show morphological characteristics of the red-back spider.

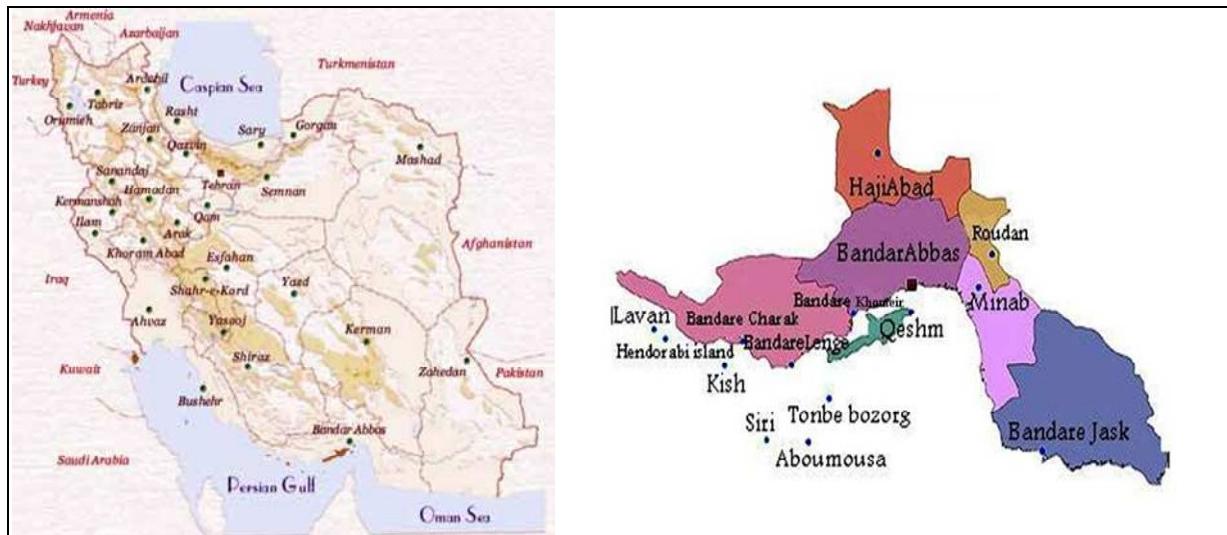


Fig. 1. Map of Hormozgan Province and situation of Bandar Abbas City, Iran



Fig. 2. Red-back spider collected from Bandar Abbas City, Iran, 2007

Fig. 3. Red-back spider's eyes pattern status



Fig. 4. Presence of one row comb-like hair under the fourth tarsus of *Latrodectus hasselti*

Discussion

Widow spiders of the genus *Latrodectus* have worldwide distribution (Graudins et al. 2001). Red-back spiders, *L. hasselti*, are widow spiders (Stallybrass 1969). Bites of *Latrodectus* are often initially painful. The neurotoxin Alpha-latrotoxin in the venom induces in 50% of the people that were hospitalized because of a terrible pain that takes from one to three days (Bonnet 1999).

There are not any noticeable studies about distribution of spiders in Iran. Rafinejad in 1997 showed that four species including *L. tredecimguttatus*, *L. dahli*, *L. geometricus* and *L. pallidus* were distributed in Khorasan Province, north east of Iran. The present studies were carried out on several cases of patients who were hospitalized due to spider bites in Bandar Abbas City. However for the first time in Iran, 2 females of red-back spider were found in Bandar Abbas City.

The genus *Latrodectus* spreads widely all over the tropical and temperate areas of the world and near human dwellings (Levi 1959). Bites of these spiders can cause abdominal cramps and pains, vomiting, nausea, and muscle cramps. Sometimes death occurs (Bonnet 1999). Although widow spiders have wide distribution in the world but transportation has an important role in their distribution. Deforesta-

tion and habitat destruction have a direct effect on species. Sometimes, species may be lost, but in many other situations, increased levels of species have followed (Walsh 1993).

Bandar Abbas Port is in the middle of the strait of Hormoz linking the Persian Gulf to the Sea of Oman. It has an international airport with regular flights to other places of Persian Gulf. However, we assume that *L. hasselti* was probably introduced in Iran by transportation of goods by ships or other media. Furthermore, in addition of hot and humidity weather in Bandar Abbas City provides suitable habitat for increasing *L. hasselti* population. Since Bandar Abbas is one of the most important crossroad of the country for export and import of agricultural and industrial goods, it is highly recommended to make available control and prevention programs and quarantine regulations and other control measures for widow spiders in the region. Also more studies are needed to highlight any probable occurrence and taxonomic situation of the spider widows the species in southern islands of Iran.

Acknowledgements

Authors are grateful to Dr. N. Ansarian (Health Center, Hormozgan University of Medical sciences) for his helpful comments. The authors declare that there is no conflict of interests.

References

- Bonnet MS (1999) The toxicology of the *Latrodectus hasselti* spider the Australian red back spider. British Homo J. 88(1): 2–6.
- Cariaso BL (1967) A biology of the black widow spider, *Latrodectus hasselti* Thorell (Araneida: Theridiidae). Philippine Agr Sci. 51: 171–180.
- Cavalieri MD, Urso D, Lassa A (1987) Characterization and some properties of the

- venom gland extract of a Theriid spider (*Steatoda paykulliana*) frequently mistaken for black widow spider (*Latrodectus tridectimus*). *Toxicon*. 25: 965–974.
- Clark RF, Wethern-Kestner S, Gerkin Vance MV (1992) Clinical presentation and treatment of black widow spider envenomation: a review of 163 cases. *Ann J Emerg Med*. 21: 782–787.
- Ellis RM, Sprivulis PC, Jelinek GA, Banham ND, Wood SV, Wilkes GJ, Siegmund A, Roberts BL (2005) A double-blind, randomized trial of intravenous versus intramuscular antivenom for Red-back spider envenoming. *Emerg Med Aust*. 17(2): 152–156.
- Forster LM, Kingsford S (1983) A preliminary study of development in two *Latrodectus* species (Araneae: Theridiidae). *New Zealand Entomol*. 7: 431–438.
- Forster LM (1984) The Australian redback spider (*Latrodectus hasselti*): its introduction and potential for establishment and distribution in New Zealand, In: Laird M (Ed): Commerce and the spread of pests and disease vectors. New York, pp. 273–289.
- Forster LM (1995) The behavioral ecology of *Latrodectus hasselti* (Thorell), the Australian redback spider (Araneae: Theridiidae): a review. *Record Western Australian Museum*. 52: 13–24.
- Geoffrey KI, Gray MR (2003) Latrodectism: a prospective cohort study of bites by formally identified redback spiders. *Med J Australia*. 179(21): 88–91.
- Graudins A, Padula M, Broady K, Nicholson GM (2001) Red-back spider (*Latrodectus hasselti*) antivenom prevents the toxicity of widow spider venoms. *Ann J Emerg Med*. 37(2): 154–160.
- Iran Climatology Center, <http://www.havairan.com>.
- Isbister GK, Gray MR (2002) A prospective study of 750 definite spider bites, with expert spider identification. *Quarterly J Med*. 95: 723–731.
- Korszniak NV, Story DF (1994) Effects of the venom of a Theriid spider, *Steatoda capensis* Hann, on automatic transmission in the rat isolated atria and caudal artery. *Toxicon*. 32: 85–96.
- Levi HW (1959) The spider genus *Latrodectus* (Araneae, Theridiidae). *Trans Am Microscopical Soc*. 78: 7–43.
- Levi HW (1983) On the value of genitalic structures and coloration in separating species of widow spiders (*Latrodectus sp.*) (Arachnida: Araneae: Theridiidae). *Verh Naturwiss Ver Hamburg*. 26: 195–200.
- Nicholson GM, Graudins A (2002) Spiders of medical importance in the Asia-Pacific: atracotoxin, latrotoxin and related spider neurotoxins. *Clin Exp J Pharma Physiol*. 29: 785–794.
- Nihei N, Yoshida M, Kaneta K, Shimamura R, Kobayashi M (2004) Analysis on the Dispersal pattern of newly Introduced *Latrodectus hasselti* (Araneae: Theridiidae) in Japan by Spider Diagram. *J Med Entomol*. 41 (3): 296–276.
- Nimorakiotakis B, Winkel KD (2004) Spider bite—the red back spider and its relatives. Reprinted from Australian Family Physician 33(3): 153–157.
- Rafinejad J (1997) An investigation on the systematic, biology and ecology of widow spiders (*Latrodectus spp.*) in Khorasan province, Iran. [PhD dissertation]. School of Public Health, Tehran University of Medical Sciences, Iran.
- Roth VD (1982) Handbook for spider Identification. Dept Zool Univ Florida, Gainesville, FL 32611
- Stallybrass FC (1969) Spider bites. *Lancet*. 15, 1: 572.
- Vetter RS, Visscher PK (1998) Bites and stings of medically important venomous arthropods. *International J Dermatol*. 37: 481–496.

Walsh JF, Molyneaux DH, Birley MH (1993)
Deforestation: Effects on vector-borne
disease. Parasitol. 106: S55–S75.